

Needs of Private Forest Owners in the Context of Changing Political Systems: Lithuania as a Case Study

Aidas Pivoriūnas

Department of Forest Products and Markets

Swedish University of Agricultural Sciences

Pauksciu takas 29, Didžioji Riese, Vilnius Region

LT-14262, Lithuania

Marius Lazdinis

Faculty of Public Management

Law University of Lithuania

Lithuania

During the first half of the 20th century the Baltic States were independent democratic nations where private forest ownership was practiced. After annexation to the Soviet Union, individuals in the Baltic States lost their ownership rights and collective ownership was introduced. Currently, after the break-up of the Soviet Union, the land restitution process in the forest sector is coming to an end and the ownership pattern as well as tenure rights are settled. A survey was undertaken to investigate the current state of the private forest sector in general, and the needs and expectations of private forest owners (PFO). Results of the study indicated that for private forest owners their forests first of all provide aesthetic and environmental protection values. Lithuanian PFOs lack information of forests and forest management, face extensive bureaucracy and need help in protecting their forests from fires, diseases and timber thieves.

Keywords: needs assessment, telephone survey, forest management, private forest owners, Baltic States

INTRODUCTION

Lithuania, along with the other two Baltic States of Latvia and Estonia, has over the last century experienced radical shifts in political systems. These shifts were directly linked to and well reflected in land tenure rights. These rights concern secure, long-term access to land and other resources, benefits from their use and carry associated responsibilities (*sensu* Barrow and Murphree 2001).

During the first half of the 20th century the Baltic States were independent democratic nations where private forest ownership was practiced. After annexation to the Soviet Union, private individuals in the Baltic States lost their ownership rights and collective ownership was introduced. For nearly 50 years after World War

II, forests in these countries were the exclusive property of the State (Gardner 1997). During this period the Baltic States were part of the Soviet Union and development in all sectors was an inseparable element of soviet politics. The Soviet constitution, which also applied to the Baltic States, provided the state with an exclusive right to ownership of land, forests, minerals and water resources. The state also owned: industries; public utilities; media; facilities for transportation, communication, health, education and culture; and most agricultural equipment and urban housing. According to the Soviet constitution, individuals could own only 'articles of everyday use, personal consumption and convenience, the implements and other objects of a small-holding, a house, and earned savings' (Gardner 1997). Politics and economics were closely linked.

The only forest users and owners in the Soviet Republics and the USSR in general were the state cooperatives and public enterprises, mass organisations and other public institutions (Ziegler 1990). Due to the centralisation of decision-making and dominance of the communist party at all levels of society, the role of the state in selection of forest policy instruments and policy implementation was overwhelming. Forest resources were to be used only according to the guidelines set down by the state and only on the basis of state authorisation (Ziegler 1990, Kallas 2002).

At the end of the 20th century the Baltic States regained their independence. Gradually the central planning system transformed into a market economy. In the forest sector, the ownership system was again changed and private forest ownership with relatively strong tenure rights was introduced. This transitional period has already lasted for 14 years. Meanwhile, both politically and economically, Estonia, Latvia and Lithuania experienced a period of fluctuating conditions. However, by the year 2000 all three countries had taken major steps in the transition from centralised to market economies and were concentrating their efforts on integration into the European Union and NATO.

The transition from the soviet system to the market economy largely affected the structure of – and the tenure rights in – the private forest sector of the three countries. The land restitution process is coming to an end and ownership pattern as well as tenure rights are settling within the society. However, the dynamic institutional context (institutions here are understood to include beliefs, norms, relationships, property rights, markets and individual agencies, *sensu* North 1990) resulted in a number of issues of concern faced by the private forest sector (Lazdinis 2002).

The objective of the research reported in this paper has been to understand the current state of the private forest sector in Lithuania in general and, more specifically, to identify the needs and expectations of private forest owners (PFOs), in the context of changing political systems. This paper assesses how PFOs are adapting to their newly gained tenure rights to the forest as well as their perceived needs to facilitate the development of the private forest sector. Due to the changing status of forest ownership, which resulted in relatively new but still economically strong and influential private forest sector, Lithuania makes an interesting case. Even though the political decision to abolish the soviet system was made 14 years ago, the pace of change in the forest sector has been much slower.

The paper first describes the study area. The survey method and procedure for selecting respondents is then outlined. The section on survey findings is divided into an assessment of the current state of private forest ownership and management, and

identification of needs and expectations related to forestry services and cooperation. The discussion section briefly addresses limitations of the study and presents implications for policy in the private forest sector of Lithuania, and the Baltic States in general.

STUDY AREA

Lithuania is located in the north-east corner of Europe and lies on the eastern coast of the Baltic Sea, to the south of Latvia and to the north of Poland and Byelorussia (Estonian Encyclopaedia Publishers 1991). Forests of Lithuania contain elements of both the temperate (nemoral) vegetation zone and the hemiboreal zone (Ahti *et al.* 1968, Hämet-Ahti 1981). Forests cover 2 M ha, or 30.8% of national area. Scots pine (*Pinus sylvestris*) stands occupy 36.5% of national forest cover, Norway spruce (*Picea abies*) 22.8% and birch (*Betula pendula*) 20.1% (Ministry of Environment and State Forest Survey Service 2003).

State forests in Lithuania occupy half of the national forest cover (Table 1). One third of forests have already been returned to private ownership and 21% still remain reserved for the restitution process (whereby land is distributed to compensate owners for land lost during the Soviet period). In this way, it is expected that the distribution of forest ownership prior to World War II will be restored. However, it is unlikely that all of those 21% will be turned over to the private sector; some of these forests will probably return under state management. Private forests in Lithuania are managed by about 200,000 private forest owners (NTKD 2003). More than 50% of PFOs in Lithuania use fuelwood in their household; over 70% indicate that timber plays an important role in their household consumption in general (as fuelwood and for construction) (Dudutis and Kupstaitis 2004).

Table 1. Administration of forest resources in Lithuania

Forest category	Area
State forests	1.017 M ha (50% of national forest cover)
Reserved for restitution	0.442 M ha (21% of national forest cover)
Private forests	0.586 M ha (29% of national forest cover)
Number of private forest owners	183,000
Average size of private forest holdings	4.5 ha ¹
National forest cover	2.009 M ha (30.8% of national land cover)

Source: Ministry of Environment and State Forest Survey Service (2003).

Forest policy implementation in Lithuania is the responsibility of the Ministry of Environment (Lazdinis and Dudutis 2001). The ministry houses the position of vice-minister, dedicated especially for forestry issues. The Forest Department is located within this ministry, which is in charge of drafting policy documents applying to

¹ In Lithuania, private forest ownership is recorded according to number of owners and number of forest holdings. While the number of PFOs is 183,000, there are many common ownerships and the number of private forest holdings is only 130,000. It is this latter figure which is used in deriving the average private forest holding size.

both state and private forests. State Forest Enterprises (SFE) – state-owned forestry companies – are trusted with the management of state forests and have little impact on private forestry (except provision of services including land preparation, timber harvesting and transportation, and coordination of fire prevention and fire-fighting activities). The State Environmental Protection Inspectorate contains forestry officers responsible for control of implementation of forest policies in forests of all types of ownership as well as for extension services in private forestry. Presently, there are two associations representing interests of PFOs. However, the participation of PFOs is negligible – less than 2% are involved in the representative organisations.

The volume of annual felling in Lithuania has increased during the last five years. In 2003, volumes felled in the state and private forests altogether comprised 5.9 M m³, which made up only 50% of gross annual increment. During the last year the volume of timber harvested from state forests decreased by 4% and that from private forests increased by 9% and in 2003 comprised 2.18 M m³ (Vizlenskas 2004).

RESEARCH METHODOLOGY

The current state of the Lithuanian private forest sector is explored within the framework of the *needs assessment* approach. The needs and expectations of PFOs are viewed in the context of demand for forestry services and cooperation. According to the definition of Witkin and Altschuld (1995), *need* is considered as a discrepancy or gap between the present state of affairs in regard to the situation of interest and desired state of affairs. A needs assessment is 'a systematic and ongoing process of providing usable and useful information about the needs of the target population – to those who can and will utilise it to make judgments about policy and programs' (Reviere *et al.* 1996, p. 6). As a rule, needs assessments have been applied by organisations and governmental agencies providing education and social services, business corporations, city municipalities, hospitals and universities (Witkin and Altschuld 1995, Reviere *et al.* 1996). However, here this approach is employed in examining the needs of PFOs. Since little secondary data on the state of private forest sector and the needs of private forest owners was available, primary data collection was necessary.

Selection of Respondents

As the first step in selection of respondents, the target group was specified, from which a stratified random sample was drawn. The target group was defined as private forest owners (individuals only, since forest ownership by legal private entities was not possible until the 1st of May, 2004) and included only individuals who were not members of any forest-related organisation (co-operative or association). The sample of PFOs was chosen by referring to the database available from The State Land Cadastre of Lithuania (as of July 1st 2003). The main criterion in order for the survey to be representative was to proportionately sample PFOs according to the size of the forest holding under ownership and geographic location. Therefore, PFOs were selected from 25 administrative regions in Lithuania (out of a total of 42 regions). The regions, for the purposes of convenience where those that had forest owners' co-operatives and local branches of the Forest Owners Association of Lithuania operating within the region.

The second step was to group the respondents according to the size of the forest holding, for which four strata were identified based on the size of forest holding under ownership, viz. up to 5 ha, 5.1 to 25 ha, 25.1 to 50 ha, and more than 50 ha. As the third step, representative respondents were selected from each stratum, using the method of systematic selection as outlined by Venclovič (1999). Following the above procedures 18 PFOs were selected from each of the 25 regions, a total sample of 450 individuals. Only 12 persons refused to participate in the survey (the response rate being 97.4%). The distribution of respondents according to the size of forest holding is reported in Figure 1. During the selection process it became apparent that a number of individuals owned forest holdings larger than 100 ha, so the 4th strata was adjusted to include individuals with forest property from 50 to 100 ha. Also, a 5th strata was added, for PFOs with forest holdings larger than 100 ha.

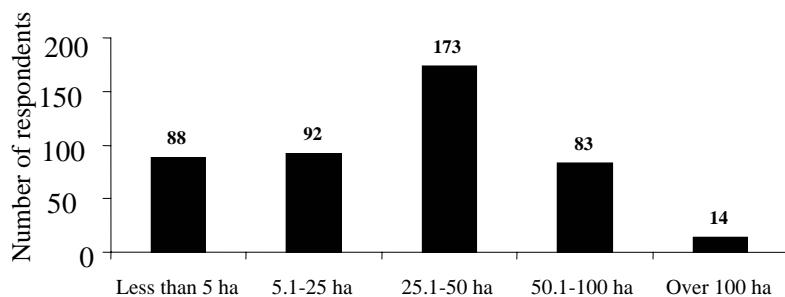


Figure 1. Distribution of respondents according to size of forest holding

The Survey Method

A sample survey approach was chosen, using a telephone survey method. A telephone survey was chosen in preference to a postal survey to minimise non-response bias. This especially applies to Lithuania, where due to present culture and traditions, mailing questionnaires can be expected to result in a very low response rate. Telephone ownership in Lithuania as at 1999 was 311 per 1000 people (UNDP 2001), which was considered as sufficiently high to enable a representative sample to be obtained.

This survey was carried out during October-December 2003. The questionnaire contained both closed and open-ended questions, as advocated by Patton (1987) and Reviere *et al.* (1996). Questions were formulated by a panel of experts in the private forest sector of Lithuania, with the intention of collecting information on the current state of private forest sector in general and the needs and expectations of private forest owners. In the case of open-ended questions (fewer), after asking each question the interviewer listened to the response and assigned the answer to one relevant category. For some questions, the respondents were allowed to provide multiple answers, which resulted in the total frequency of responses being higher than the sample size.

Quality Control Procedures Adopted in the Survey

Some limitations may have arisen from the telephone survey, as well as in the survey approach in general. However, it is considered that telephone surveys yield

higher quality information than postal surveys. One of the potential errors in this type of survey is purposive or unwitting actions by the interviewer, leading the respondent to an expected answer. In this telephone survey, the error was minimised by using an instrument designed to resemble a well-structured conversation with a clear beginning, middle and end. Another limitation is that respondents may be reluctant to provide information which they perceive as confidential. Therefore, during each interview respondents were assured of confidentiality.

It is also common that, when asked about their needs directly, interviewees have difficulties in explicitly formulating their responses (Reviere *et al.* 1996). Therefore, in this study, four of the five questions that assessed needs and expectations addressed issues from which the evaluators formulated needs, and only one question directly asked about the respondents' perceptions.

Interviews were conducted by an independent public survey company, which specialises in environmental issues and has experience in the forest sector. This minimised the errors which could have occurred due to misunderstanding and misinterpretation of responses to open-ended questions.

SURVEY FINDINGS

Present State of Forest Ownership and Management

Five questions were asked in order to learn about the current state of private forest sector in Lithuania in general (Table 2). The results show that PFOs in Lithuania generally think that their forest provides them with aesthetic values (37%) (Table 2, Q1). Slightly fewer than one-third (29%) prioritise economic aspects of forest ownership (view forest as a source of income as well as a sound investment). However, for almost 11% of forest owners in Lithuania forest is a 'headache', meaning that the burden related to the forest ownership outweighs all the positive experiences.

It appears that the majority of PFOs in Lithuania (73%) tend to manage their forests themselves (Table 2, Q2). Only 14% have delegated management of their forest properties (or requested for management service) of an external body – privately hired person (most common), state forest enterprise or forest owners' co-operative. A number of PFOs (13.1%) do not manage their forest at all. Among the management activities carried out by the interviewed PFOs, sanitation fellings (as well as other cuttings except final felling and thinning) were the most common (83 individuals), closely followed by preparation of forest management plans (Table 2, Q3). Seventy nine respondents had a management plan for their forest holding, a management plan being compulsory for final felling activities only. Notably, 179 individuals carried out some type of felling on their forest property. Only 46 individuals reported reforestation activities.

The majority of PFOs in Lithuania plan to maintain forest ownership in order to pass the forest on to their heirs (57%) (Table 3, Q4). Twenty-nine percent plan to increase the size of their property, considerably more than the 13% perceiving forest as a sound investment. Less than 3% plan to sell their property either before or after harvesting the trees. Over 90% of respondents thought that a forest area of at least 100 ha is necessary to ensure economic viability, and nearly 40% considered an area of at least 200 ha is needed.

Table 2. Questions and responses representing the state of private forest ownership and management

Question asked	Response option	Frequency of response	
		Number	%
<i>Q1. What does the forest mean to you?</i>	Aesthetic value	166	36.9
	Environment protection	98	21.8
	Source of income	70	15.6
	Investment opportunity	58	12.9
	Headache	48	10.7
	Recreational (hunting) value	10	2.2
Total		450	100.0
<i>Q2. Who is currently taking care of your private forest holding?</i>	Myself/my family	330	73.3
	No one	59	13.1
	Privately hired person	33	7.3
	State forest enterprise	17	3.8
	Forest owners' co-operative	11	2.4
	Total	450	100.0
<i>Q3. Have you carried out any activities on your forest property?</i>	No activities	124	27.6
	Sanitation and other felling	83	18.4
	Forest management plan prepared	79	17.6
	Final felling	61	13.6
	Reforestation	46	10.2
	Thinning	35	7.8
	Forest nursery established	10	2.2
	Forest drainage	8	1.8
	Rest areas established	2	0.4
	Commercial use of non-timber forest	2	0.4
Total^a		100.0	
<i>Q4. What do you plan on doing with your forest?</i>	Will maintain to turn over to heirs	258	57.3
	The size will be increased	130	28.9
	Did not consider	50	11.1
	Will sell before harvesting	6	1.3
	Will sell after harvesting	6	1.3
Total		450	100.0
<i>Q5. What is the necessary size of forest holding to ensure economically viable forestry?</i>	50 ha	35	7.8
	100 ha	130	28.9
	150 ha	112	24.9
	200 ha	94	20.9
	300 ha	58	12.9
	500 ha	7	1.6
	1000 ha	14	3.1
Total		450	100.0

a. Total frequency of responses is not reported since the respondents were given the opportunity to name several activities carried out.

Needs and Expectations Related to Forestry Services and Cooperation

Five questions were asked to assess the needs of PFOs. PFOs in Lithuania seem to be the most concerned with the high level of bureaucracy (22%) (Table 3, Q1), with

illegal timber harvesting (16%) and lack of specialised information (15%) also being considered important issues.

When asked to identify their needs in forest management, 58% of PFOs reported that forest protection from fires, diseases and illegal cuttings were the most required services, and 44% expressed a wish to gain more knowledge about forest in general and forest management through informational brochures, training courses and other means of extension (Table 3, Q2). About one third considered they need services for commercial forestry activities and only 9% saw the need to have some type of public body representing their interests. Moreover, 38% are not willing to delegate management of their forest holding to private forestry companies (cooperatives) or to the forestry professionals (state employees) (Table 3, Q3).

About 34% of PFOs are ready to hire a professional to take care of their forest holding and provide forest management services, and slightly more than 25% have no opinion concerning this issue. Considering that only 14% of PFOs so far have delegated management of their forest properties (or made a request for management service) to the external body (Table 2, Q2), there seems to be a need for services in commercial forestry activities, even though it was not directly indicated so by the PFOs.

Regional press was seen by PFOs as the most effective and convenient way to obtain knowledge on forestry activities (108 out of 450 respondents) followed by informational leaflets (88) (Table 3, Q4). TV and radio programs are also seen as a desirable source of educational and know-how information (80 and 68 respectively). Few respondents view Internet as a preferred source of information (only nine respondents out of 450).

Even though only a few PFOs are using services of forest owners' co-operatives (Table 2, Q2), they might join these entities if this would provide an advantage in accessing EU funds and receiving tax privileges (31% and 22% respectively) (Table 3, Q5). Conventional forestry services (more efficient forest management and higher roundwood prices) would attract 30% of interviewed PFOs to join a forest owners' co-operative.

IMPLICATIONS OF RESULTS

Recent empirical studies reveal that private forest owners differ widely in their values, attitudes and objectives towards management of their holdings. However, these studies suggest that, in general, expectations from forest ownership and long-term objectives in management are strongly correlated. The majority of forest owners in different countries usually express their strong commitment to manage their forests with a long-term perspective (e.g. Kurtz and Lewis 1981, Törnqvist 1997, Bliss and Martin 1989, Lönnstedt 1989, 1998, Karppinen 1998, Lönnstedt and Rutegård 2000, Lönnstedt and Svensson 2000, Mizaraitė 2001). The same can be said about Lithuanian PFOs, as has been shown in this study. Despite a very recent status of ownership, PFOs in Lithuania seem to be highly conservative – being directly involved in management of their forests and willing to maintain these forests in order to pass them on to their heirs. However, in the context of these long-term views, some features, which cannot be attributed to traditional forest management, are explicit.

Table 3. Questions and responses representing the needs and expectations related to forestry services and cooperation

Question asked	Response option	Frequency of response	
		Number	%
<i>Q1. What are the main problems faced in forest management?</i>	Bureaucracy	99	22.0
	Illegal logging	72	16.0
	Difficulties to get information	68	15.1
	Felling and timber trade	54	12.0
	Difficult to get permissions	50	11.1
	Difficult to manage	44	9.8
	No-one to trust	40	8.9
	No time	23	5.1
Total		450	100.0
<i>Q2. What services you need as a PFO?</i>	Forest protection from fires, diseases	262	39.5
	Informational brochures, training	200	30.1
	Contracting forest management services	152	22.9
	Representation of owners' interests	50	7.5
	Total	664 ^a	100.0 ^b
<i>Q3. Would you trust management of your forest to forestry professionals?</i>	No	171	38.2
	Yes	151	33.5
	I do not know	115	25.5
	It depends on the type of service and	13	2.8
	Total	450	100.0
<i>Q4. What are your preferred sources of information?</i>	Regional press	108	21.2
	Informational leaflets	88	17.3
	Special TV programs	80	15.7
	Special radio programs	68	13.3
	Professional advice	57	11.2
	Short courses	52	10.2
	Educational literature	21	4.1
	Special seminars	19	3.7
	Internet	9	1.8
	Friends' advice	8	1.6
Total		510 ^a	100.0 ^b
<i>Q5. What factors would encourage you to join forest owners' cooperative?</i>	Advantages to access EU funds	140	31.1
	Advantages to receive tax privileges	100	22.2
	More efficient forest management	80	17.8
	Higher roundwood prices	55	12.2
	Extension and consultation services	40	8.9
	Good image/reputation	20	4.4
	Friends'/relatives' recommendation	15	3.3
Total		450	100.0

a. This number reports the total frequency of responses, which does not correspond with the total number of individuals interviewed, since respondents were provided with an opportunity to name several options.

b. This percentage rate demonstrates distribution of responses among the options provided for the respondents.

PFOs in Lithuania seem to be enjoying more aesthetic and environmental protection functions of forests as compared to the economic aspects of forest ownership. The above finding, which may be alarming to traditional foresters, may have two explanations. First, low interest in economic aspects of forestry could be part of overall changing perception of forestry in Europe and in the rest of the world (Ticknor 1993, Kennedy *et al.* 2001, Sayer and Campbell 2003). As a result of this trend, forestry is increasingly perceived as unpopular activity, which may be harmful to the environment and in conflict with other, presently more popular interests of society in forests or rural development in general (Elands *et al.* 2004). As a part of this trend, environmental and aesthetic functions of forests may be prioritised by the modern societies, and if so, findings of this study only confirm these shifts in perceptions of the values of forests, even in an economy in transition and with relatively low levels of personal income.

A second explanation is that low economic interest in forests could be due to a lack of information on the rights, benefits and responsibilities affiliated with the forest land tenure rights. It may be hypothesised that the recent status of forest ownership and still highly dynamic institutional context in the transitional phase does not allow PFOs in Lithuania to fully enjoy all benefits provided by forest ownership and worries them with unknown and unfamiliar responsibilities. Such an explanation is supported by the findings of this study, which reveals the explicitly expressed desire of PFOs for help in dealing with protection of forests from fires, diseases and illegal cutting as well as need of information on forests and forest management provided through a variety of means of communication.

The cooperation and collaborative management of private forest resources would allow PFOs to shift some of the burden concerning management of their forests onto external bodies or those with related interests (Bergmann and Bliss 2004). However, few PFOs have so far requested professional help and delegated some of the forestry activities. Interestingly, this study indicates that about one third of PFOs in Lithuania would be willing to hire a professional and another quarter is undecided. Again, this gap between intentions and practice could be attributed to a low awareness of the sector and little trust with existing services in the sector. It may be expected that with the use of awareness raising and information measures, and more secure and less dynamic tenure rights, the demand for services in forestry activities will increase.

Several findings of this study appear to warrant consideration by policy makers. First, there is a need to pursue actively sustainable management of private forests in Lithuania. PFOs are relatively passive, and if this trend continues then the role of and need for forestry will disproportionately diminish. In order to maintain the balance between ecological, social, and economic functions of forest management, forestry should become more attractive to PFOs. Second, and as a consequence, policy makers should acknowledge the need for extension and outreach programs. The efforts to educate PFOs in forestry matters should be coupled with attempts to reduce bureaucracy and regulation in forestry-related activities. Third, the broadened range of services in the private forest sector should be brought closer to the owner. The potential for trust between PFO and professional service provider should be utilised. However, this can only be done by working closely with the PFOs and considering all of their needs and interests in forest management, which in many cases may not be financially viable from the conventional forestry point of view.

CONCLUSIONS

This study has revealed that forests provide to private forest owners first of all aesthetic and environmental protection values. PFOs in Lithuania tend to manage their forests themselves and they plan to pass on forest estates to their heirs. Lithuanian PFOs lack information of forests and forest management, face extensive bureaucracy and need assistance in protecting their forests from fires, diseases and timber thieves. They also would be willing to join cooperative bodies of PFOs if this would provide them with advantages of accessing EU structural funds or would reduce a burden of taxes.

Despite the fact that Lithuania was selected as a case study area, the findings of this study could be of relevance to the other two Baltic States, and maybe even some other countries of eastern and central Europe with similar political conditions. The authors of this study strongly recommend that the results of needs assessments as such would find their way into forest policy processes on the national and local levels and would become a systematic element of continuing forest management planning cycles.

ACKNOWLEDGMENTS

We wish to thank the FAO Forestry Department for co-financial contribution, which enabled us to carry out this study. We also thank Mrs Jelena Anečik and Mrs Halina Petrulevič for helping with the interviews of private forest owners.

REFERENCES

Ahti, T., Hämet-Ahti, L. and Jalas, J. (1968), 'Vegetation zones and their sections in northwestern Europe', *Annales Botanica Fennica*, 5: 169-210.

Barrow, E. and Murphree, M. (2001), 'Community Conservation: From Concept to Practice', in D. Hulme and M. Murphree (eds), *African Wildlife & Livelihoods: The promise and performance of community conservation*, James Currey, Oxford, pp. 24-37.

Bergmann, S.A. and Bliss, J.C. (2004), 'Foundations of Cross-Boundary Cooperation: Resource Management at the Public-Private Interface', *Society and Natural Resources*, 17(5): 377-393.

Bliss, J.C. and Martin, A.J. (1989), 'Identifying NIPF Management Motivations with Qualitative Methods', *Forest Science*, 35(2): 601-622.

Connelly, N.A., Brown, T.L. and Decker, D.J. (2003), 'Factors affecting response rates to natural resource-focused mail surveys: Empirical evidence of declining rates over time', *Society and Natural Resources*, 16: 541-549.

Estonian Encyclopaedia Publishers, Latvian Encyclopaedia Publishers, and Lithuanian Encyclopaedia Publishers, (1991), *The Baltic States: A Reference Book*, Tallinn Book Printers, Tallinn, Estonia.

Gardner, H.S. (1997), *Comparative Economic Systems*, 2nd edn, Dryden Press, Philadelphia.

Hämet-Ahti, L. (1981), 'The boreal zone and its biotic subdivision', *Fennia*, 159: 69-75.

IPCC, (1990), *Climate change*, J.T. Houghton *et al.* (eds), The Intergovernmental Panel on Climate Change Scientific Assessment, Cambridge University Press, Cambridge.

Kallas, A. (2002), 'Public forest policy making in post-Communist Estonia', *Forest Policy and Economics*, 4: 323-332.

Karppinen, H. (1998), 'Values and Objectives of Non-Industrial Private Forest Owners in Finland', *Silva Fennica*, 32(1): 44-54.

Kennedy, J.J., Thomas, J.W. and Glueck, P. (2001), 'Evolving forestry and rural development beliefs at midpoint and close of the 20th century', *Forest Policy and Economics*, 3(1-2): 81-95.

Kurtz, W.B., Lewis, B.J. (1981), 'Decision-Making Framework for Non-Industrial Private Forest Owners: An Application in the Missouri Ozarks', *Journal of Forestry*: 285-288.

Lazdinis, M. (2002), 'Facilitating sustainable forest development: Comparative analysis of post-soviet forest politics in the Baltic States', PhD Dissertation, Southern Illinois University, Carbondale, Illinois.

Lazdinis, M. and Dudutis, D. (2001), 'Reform of the Lithuania's Forest Sector Administration', *Baltic Timber Journal*, 2(5): 10-13.

Lönnstedt, L. (1989), 'Goals and Cutting Decisions of Private Small Forest Owners', *Scandinavian Journal of Forest Research*, 4: 259-265.

Lönnstedt, L. (1998), 'Calculating Non-Industrial Private Forest Owners' Cuttings', *Scandinavian Journal of Forest Research*, 13: 215-223.

Lönnstedt, L. and Rutegård, G. (2000), 'Cases about Financing Acquisitions of NIPF Estates. A Comparison with Dynamic, Multi-Stage Optimisation Model Solutions', Manuscript, Department of Forest Management, Swedish University of Agricultural Sciences, Uppsala.

Lönnstedt, L. and Svensson, J. (2000), 'Non-Industrial Private Forest Owners' Risk Preferences', *Scandinavian Journal of Forest Research*, 15: 651-660.

Ministry of Environment and State Forest Survey Service, (2003), Lithuanian Statistical Yearbook of Forestry, State Forest Survey Service, Kaunas, Lithuania.

Mizaraitė, D. (2001), 'Privačių miškų savininkų ūkininkavimo tikslai, problemos ir poreikiai bei juos lemiantys veiksnių (Objectives, problems and needs of the private forest owners as well as dependence on various factors)', *Miškininkystė*, 1(49): 33-46.

NTKD, (State Land Cadastre of Lithuania database on private forest owners), (2003), State Land Cadastre and Register, Vilnius.

North, D. C. (1990), *Institutions, institutional change and economic performance*, Cambridge University Press.

Patton, M.Q. (1987), *How to use qualitative methods in evaluation*, SAGE Publications, Newbury Park, California.

Reviere, R., Berkowitz, S., Carter, C.C., and Ferguson, C.G. (1996), 'Introduction: Setting the Stage', in *Needs Assessment: A Creative and Practical Guide for Social Scientists*, Taylor and Francis, Washington DC, pp. 1-12.

Sayer, J.A. and Campbell, B.M. (2003), 'Research to integrate productivity enhancement, environmental protection and human development', in B.M.Campbell and J.A. Sayer (eds), *Integrated natural resource management: linking productivity, environment and development*, CABI Publishing and Centre for International Forestry Research (CIFOR), pp. 1-14.

Ticknor, W.D. (1993), 'Sustainable forestry: redefining the role of forest management', in G.H. Aplet, N. Johnson, J.T. Olson and V.A. Sample (eds), *Defining Sustainable Forestry*, Island Press, Washington DC, pp. 260-269.

Törnqvist, T. (1997), 'The Socio-Economic Structure of Small-Scale Forest Ownership in Sweden', *Commonwealth Forestry Review*, 76(1): 37-40.

Venclovienė, J. (1999), Programų paketo 'Statistika' taikymas aplinkos tyrimų duomenų analizei (unpublished), Vytauto Didžiojo Universiteto, pp. 2-25.

Vizlenskas, D. (2004), '2003 m. Lietuvos medienos rinkos analize (Lithuanian timber market analysis for the year 2003)', *Baltijos miskai ir mediena* (In Lithuanian) 1(3): 56-63.

Witkin, B.R. and Altschuld, J.W. (1995), *Planning and Conducting Needs Assessments: A Practical Guide*, SAGE Publications, Thousand Oaks, p. 302.

Ziegler, C.E. (1990), *Environmental Policy in the USSR*, University of Massachusetts Press, Amherst.